What is Claimed:

Sub A4

1. A method for measuring registration errors and chromatic aberration in video signals, said video signals being represented as least first and second color signals and said registration errors and chromatic aberration appearing as misaligned edges of the first and second color signals in an image reproduced from the video signals, the method comprising the steps of:

a) selecting a first set of N samples of the first color signal and a second set of N samples of the second color signal, where N is an integer greater than 2;

b) analyzing the set of samples of the first color signal to determine whether the first set of samples contains M samples representing an edge in the image, where M is an integer less than N, and storing the first and second sets of samples if the first set of samples is determined to contain the M samples representing the edge; and

c) comparing the stored first set of samples to the stored second set of samples to determine a displacement between the M samples in the first set of samples with M corresponding samples in the second set of samples.

2. A method according to claim 1, wherein step a) further includes the steps of:

calculating a measure of color balance between the first set of samples and the second set of samples; and

discarding the first and second sets of samples if the measure of color balance has a value which is not within a predetermined range.

3. A method according to claim 2, wherein the first and second sets of samples represent image picture elements (pixels) in a line of the image and step a) further includes the steps of:

selecting third and fourth sets of samples of said first color signal, each of the samples in the third and fourth sets of samples corresponding to a pixel which is immediately adjacent to a respective pixel element in said first set of samples;

analyzing the first, third and fourth sets of samples to determine whether the first set of samples is adjacent to an edge which is parallel to the line of the image or represent an edge which intersects the line of the image on a diagonal; and

discarding the first, second, third and fourth sets of samples if the first set of samples is adjacent to the parallel edge or represents the diagonal edge.

Sub A5 4. A method according to claim 1, wherein M equals 2 and step b) includes the steps of:

calculating difference values between successive ones of the samples in the first set of samples;

comparing each of the calculated difference values to an edge threshold value; and

indicating that the set of samples represents an edge if any of the calculated difference values is greater than the edge threshold value.

5. A method according to claim 1, wherein step c) includes the steps of:

performing a cross correlation between the stored first set of samples and the stored second set of samples to identify a coarse displacement between respective edges in the first and second sets of samples to a nearest intersample distance;

selecting the M samples from the stored first set of samples and M corresponding samples from the stored second set of samples, wherein each of the samples from the second set is displaced by the identified displacement from the respective sample in the first set;

interpolating S samples between successive ones of the M samples of each of the first and second sets of samples, where S is an integer;

performing a cross correlation between the respective M original and interpolated samples of the first and second sets of samples to identify a fine displacement between the first and second sets of samples which is less than one intersample distance of the original samples from a central sample of the M samples of the first set of samples; and

combining the coarse displacement and the fine displacement to obtain the measure of the registration errors and chromatic aberration errors in the video signals.

6. A method according to claim 1, wherein step c) includes the steps of:

performing a cross correlation between the stored first set of samples and the stored second set of samples to identify a coarse displacement between respective

edges in the first and second sets of samples to a nearest intersample distance and storing a correlation value at each displacement considered in the cross correlation;

selecting at least three of the stored correlation values including the correlation value corresponding to the identified displacement;

fitting a parabolic curve to the selected correlation values;

determining a maximum point of the parabolic curve as a fine displacement; and

combining the coarse displacement and the fine displacement to obtain the measure of the registration errors and chromatic aberration errors in the video signals.

7. A method according to claim 1, wherein step c) includes the steps of:

generating respective measures of sum of absolute difference between the M samples of the first stored set of samples and M samples of the second stored set of samples for respectively different displacements between the first stored set of samples and the second stored set of samples;

identifying a coarse displacement as the sum of absolute difference measures which is less than or equal to any other one of the sum of absolute difference measures;

selecting the M samples from the stored first set of samples and M corresponding samples from the stored second set of samples, wherein each of the samples from the second set is displaced by the coarse displacement from the respective sample in the first set;

interpolating S samples between successive ones of the M samples of each of the first and second sets of samples, where S is an integer;

performing a cross correlation between the respective M original and S interpolated samples of the first and second sets of samples to identify a fine displacement between the first and second sets of samples which is less than one intersample distance of the original samples from a central sample of the M samples of the first set of samples; and

combining the coarse displacement and the fine displacement to obtain the measure of the registration errors and chromatic aberration errors in the video signals.

8. A method according to claim 1, wherein step c) includes the steps of:

generating respective measures of sum of absolute difference between the M samples of the first stored set of samples and M samples of the second stored set of samples for respectively different displacements between the first stored set of samples and the second stored set of samples;

identifying a coarse displacement as the sum of absolute difference measures which is less than or equal to any other one of the sum of absolute difference measures;

selecting at least three of the measures of sum of absolute difference including the measure corresponding to the coarse displacement;

fitting a parabolic curve to the selected measures;

determining a minimum point of the parabolic curve as a fractional intersample distance to be combined with the identified displacement to produce the measured displacement value.

9. Apparatus for measuring registration errors and chromatic aberration in video signals, said video signals being represented as least first and second color signals and said registration errors and chromatic aberration appearing as misaligned edges of the first and second color signals in an image reproduced from the video signals, the method comprising:

means for selecting a first set of N samples of the first color signal and a second set of N samples of the second color signal, where N is an integer greater than 2;

a video memory;

means for analyzing the set of samples of the first color signal to determine whether the first set of samples contains M samples representing an edge in the image, where M is an integer less than N, and storing the first and second sets of samples in the video memory if the first set of samples is determined to contain the M samples representing the edge; and

means for comparing the stored first set of samples to the stored second set of samples to determine a displacement between the M samples in the first set of samples with M corresponding samples in the second set of samples.

10. Apparatus according to claim 9, wherein the means for selecting further includes:

means for calculating a measure of color balance between the first set of samples and the second set of samples; and

means for inhibiting the storage of the first and second sets of samples into the memory if the measure of color balance has a value which is not within a predetermined range.

11. Apparatus according to 10, wherein the first and second sets of samples represent image picture elements (pixels) in a line of the image and the means for selecting further includes:

means for selecting third and fourth sets of samples of said first color signal, each of the samples in the third and fourth sets of samples corresponding to a pixel which is immediately adjacent to a respective pixel element in said first set of samples;

means for analyzing the first, third and fourth sets of samples to determine whether the first set of samples is adjacent to an edge which is parallel to the line of the image or represent an edge which intersects the line of the image on a diagonal; and

means for inhibiting the storage of the first and second sets of samples if the first set of samples is determined to be adjacent to the parallel edge or represents the diagonal edge.

12. Apparatus according to claim 9, wherein M equals 2 and the means for analyzing includes:

means for calculating difference values between successive ones of the samples in the first set of samples;

means for comparing each of the calculated difference values to an edge threshold value to indicate that the set of samples represents an edge if any of the calculated difference values is greater than the edge threshold value.

SUB A67 13. A method according to claim 9, wherein the means for comparing includes:

first correlation means for performing a cross correlation between the stored first set of samples and the stored second set of samples to identify a coarse displacement between respective edges in the first and second sets of samples to a nearest intersample distance;

means for selecting the M samples from the stored first set of samples and M corresponding samples from the stored second set of samples, wherein each of the samples from the second set is displaced by the identified displacement from the respective sample in the first set;

means for interpolating S samples between successive ones of the M samples of each of the first and second sets of samples, where S is an integer;

second correlation means for performing a cross correlation between the respective M original and S interpolated samples of the first and second sets of samples to identify a fine displacement between the first and second sets of samples which is less than one intersample distance of the original samples from a central sample of the M samples of the first set of samples; and

means for combining the coarse displacement and the fine displacement to obtain the measure of the registration errors and chromatic aberration errors in the video signals.

14. Apparatus according to claim 9, wherein the means for comparing includes:

means for performing a cross correlation between the stored first set of samples and the stored second set of samples to identify a coarse displacement between respective edges in the first and second sets of samples to a nearest intersample distance and storing a correlation value at each displacement considered in the cross correlation;

means for selecting at least three of the stored correlation values including the correlation value corresponding to the identified displacement;

means for fitting a parabolic curve to the selected correlation values;

means for determining a maximum point of the parabolic curve as a fine displacement; and

means for combining the coarse displacement and the fine displacement to obtain the measure of the registration errors and chromatic aberration errors in the video signals.

15. Apparatus according to claim 9, wherein the means for comparing includes:

means for generating respective measures of sum of absolute difference between the M samples of the first stored set of samples and M samples of the second stored set of samples for respectively different displacements between the first stored set of samples and the second stored set of samples;

means for identifying a coarse displacement as the sum of absolute difference measures which is less than or equal to any other one of the sum of absolute difference measures;

means for selecting the M samples from the stored first set of samples and M corresponding samples from the stored second set of samples, wherein each of the samples from the second set is displaced by the coarse displacement from the respective sample in the first set;

means for interpolating S samples between successive ones of the M samples of each of the first and second sets of samples, where S is an integer;

means for performing a cross correlation between the M original and S interpolated samples of the first and second sets of samples, respectively, to identify a fine displacement between the first and second sets of samples which is less than one intersample distance of the original samples from a central sample of the M samples of the first set of samples; and

means for combining the coarse displacement and the fine displacement to obtain the measure of the registration errors and chromatic aberration errors in the video signals.

16. Apparatus according to claim 9, wherein the means for comparing includes:

means for generating respective measures of sum of absolute difference between the M samples of the first stored set of samples and M samples of the second

stored set of samples for respectively different displacements between the first stored set of samples and the second stored set of samples;

means for identifying a coarse displacement as the sum of absolute difference measures which is less than or equal to any other one of the sum of absolute difference measures;

means for selecting at least three of the measures of sum of absolute difference including the measure corresponding to the coarse displacement;

means for fitting a parabolic curve to the selected measures;

means for determining a minimum point of the parabolic curve as a fractional intersample distance to be combined with the identified displacement to produce the measured displacement value.